PUBLIC INFORMATION SESSION: Eastern Shore Poultry Groundwater Withdrawal Permitting

April 30, 2019

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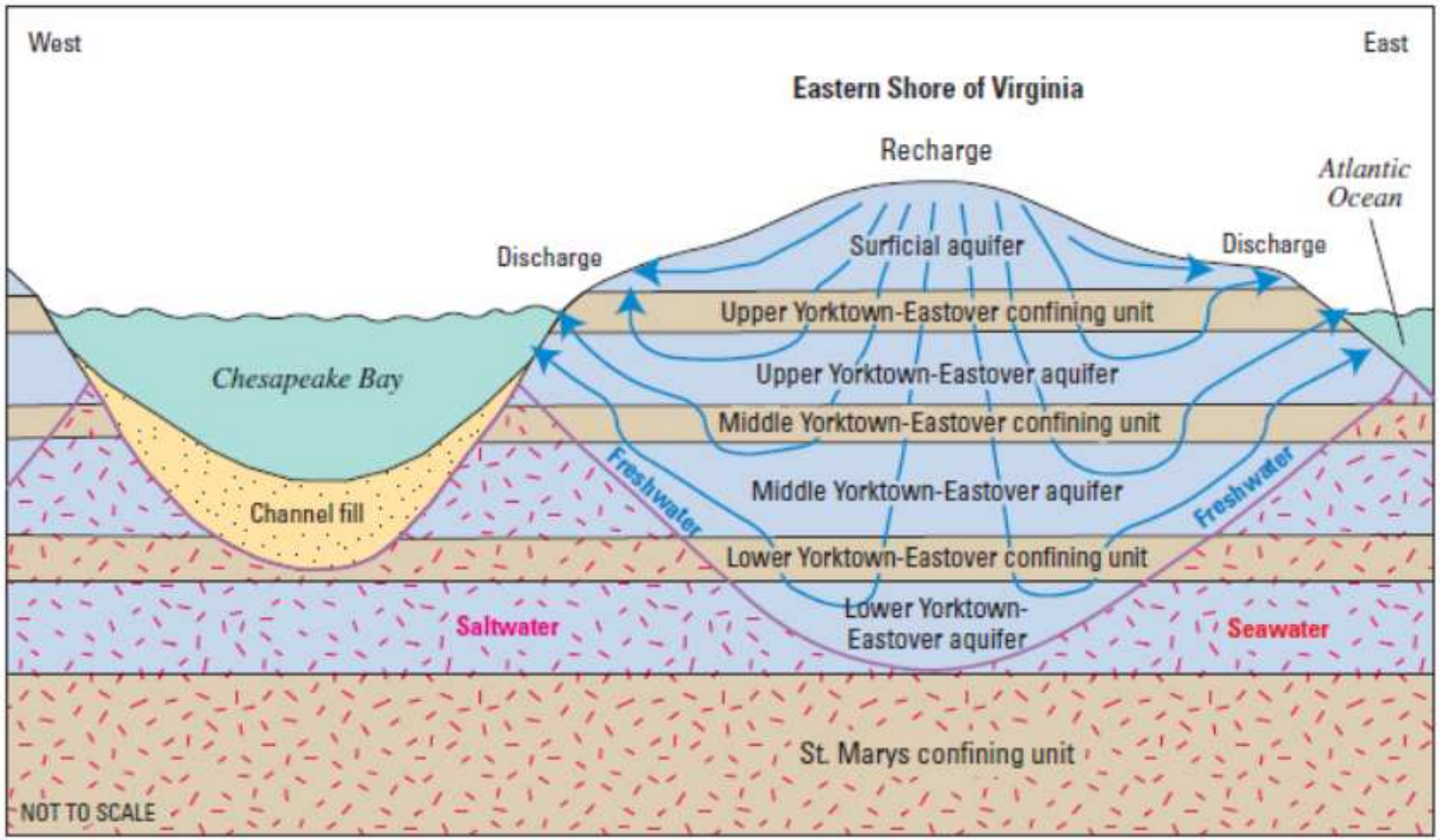
Overview

- Hydrogeology of Eastern Shore
- Review Poultry Groundwater Withdrawal Activity
- How does DEQ evaluate permit applications?
- What do those evaluations show?
- What do groundwater permits include?
- What comes next in the process?

Hydrogeology of the Eastern Shore

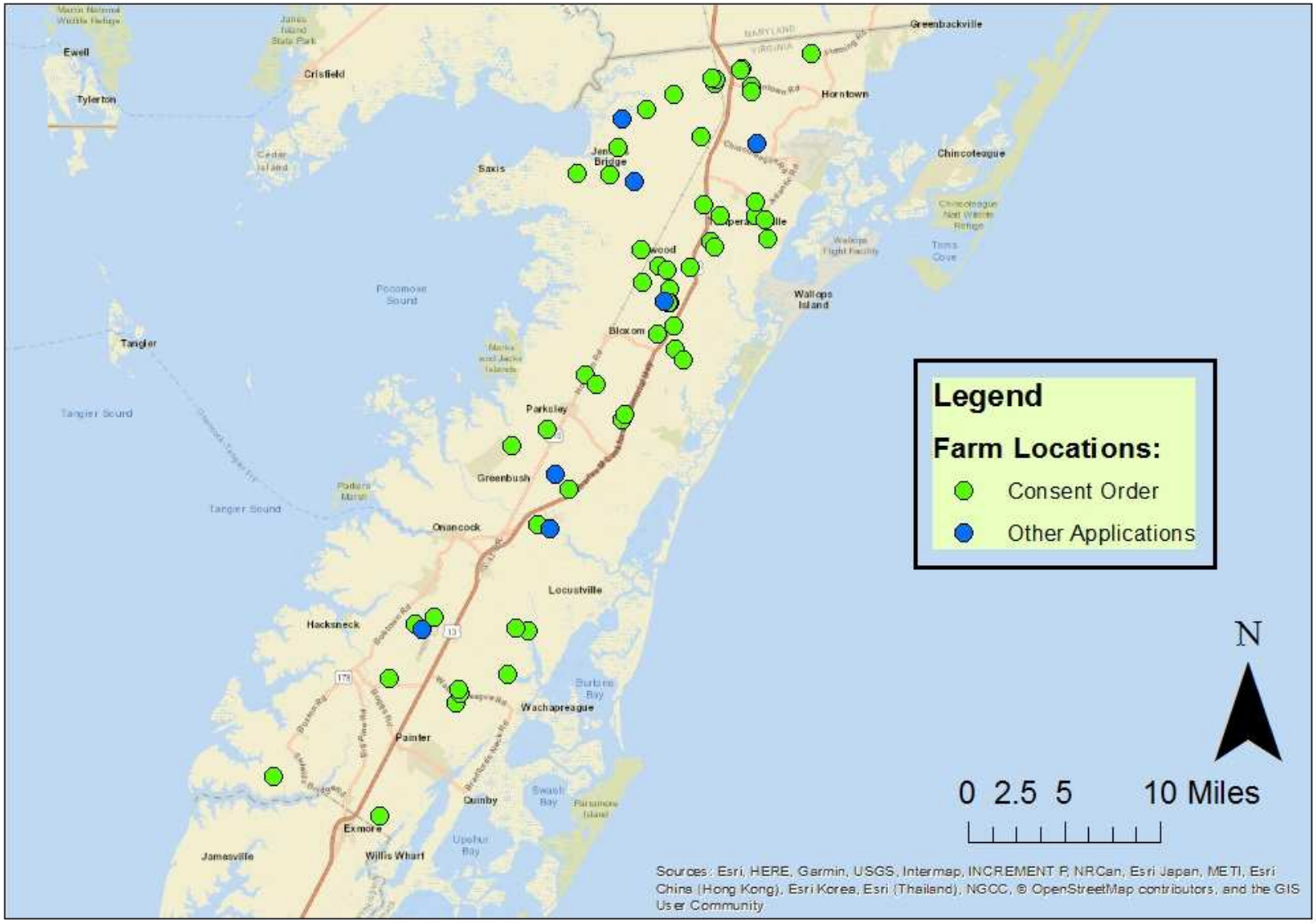


Background

- A groundwater permit is required for any facility withdrawing more than 300,000 gallons in any month (from all wells)

- In Sept 2018, Consent Special Orders were issued to 56 poultry farms:
  - 54 facilities require a permit
  - Reporting required until a permit decision is made

Groundwater Withdrawal Permitting - Poultry Farms - Eastern Shore



Permitting Process

- ✓ Pre-application
- ✓ Application
- ✓ DEQ Evaluation
- Public Involvement
- Permit Decision

How does DEQ evaluate a permit application?

1) Demand Justification – amount requested and need
2) Alternatives Analysis – evaluation of other sources
3) Technical Evaluation – potential impacts to confined aquifers and other existing withdrawals

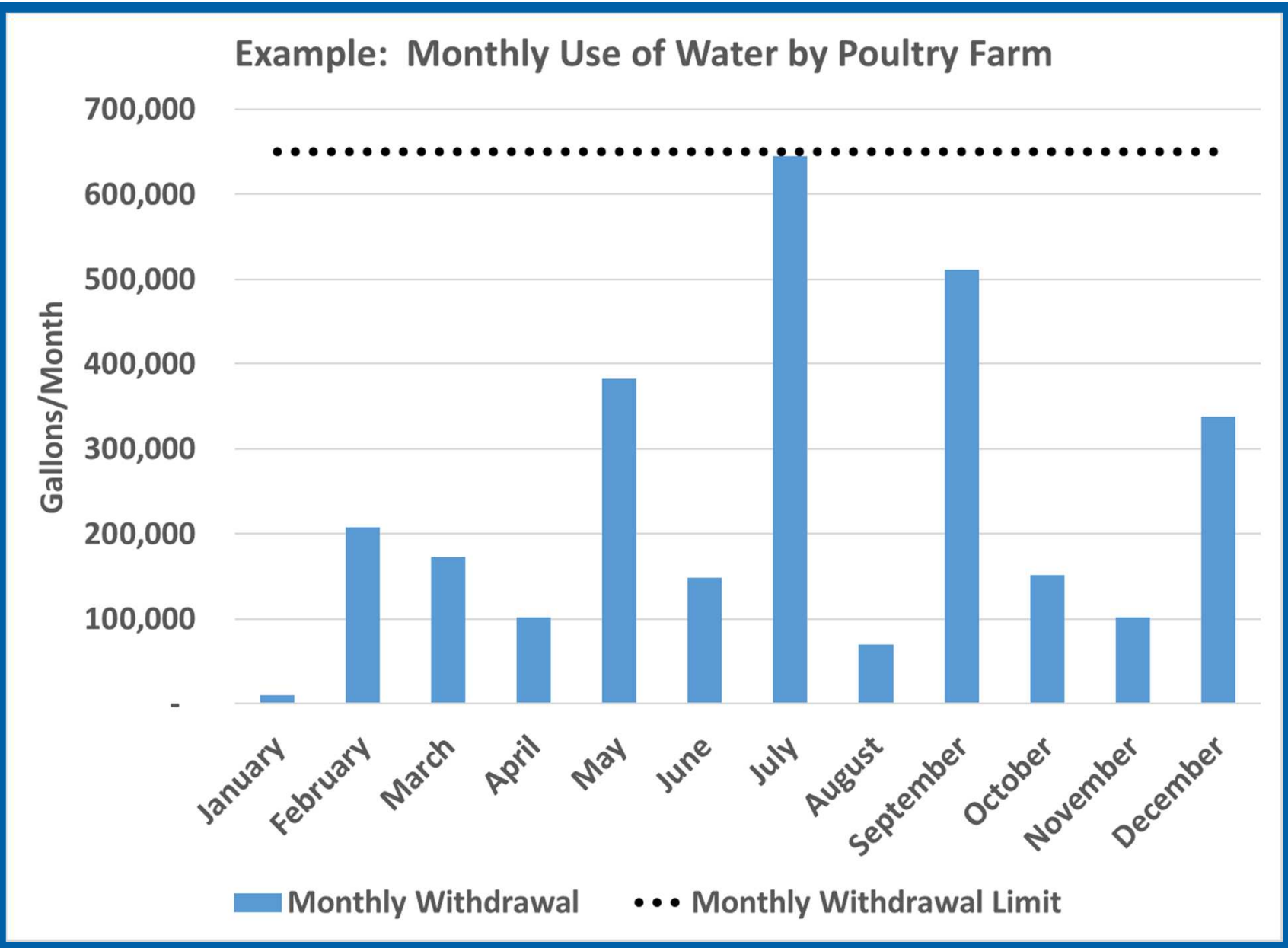
Demand Justification

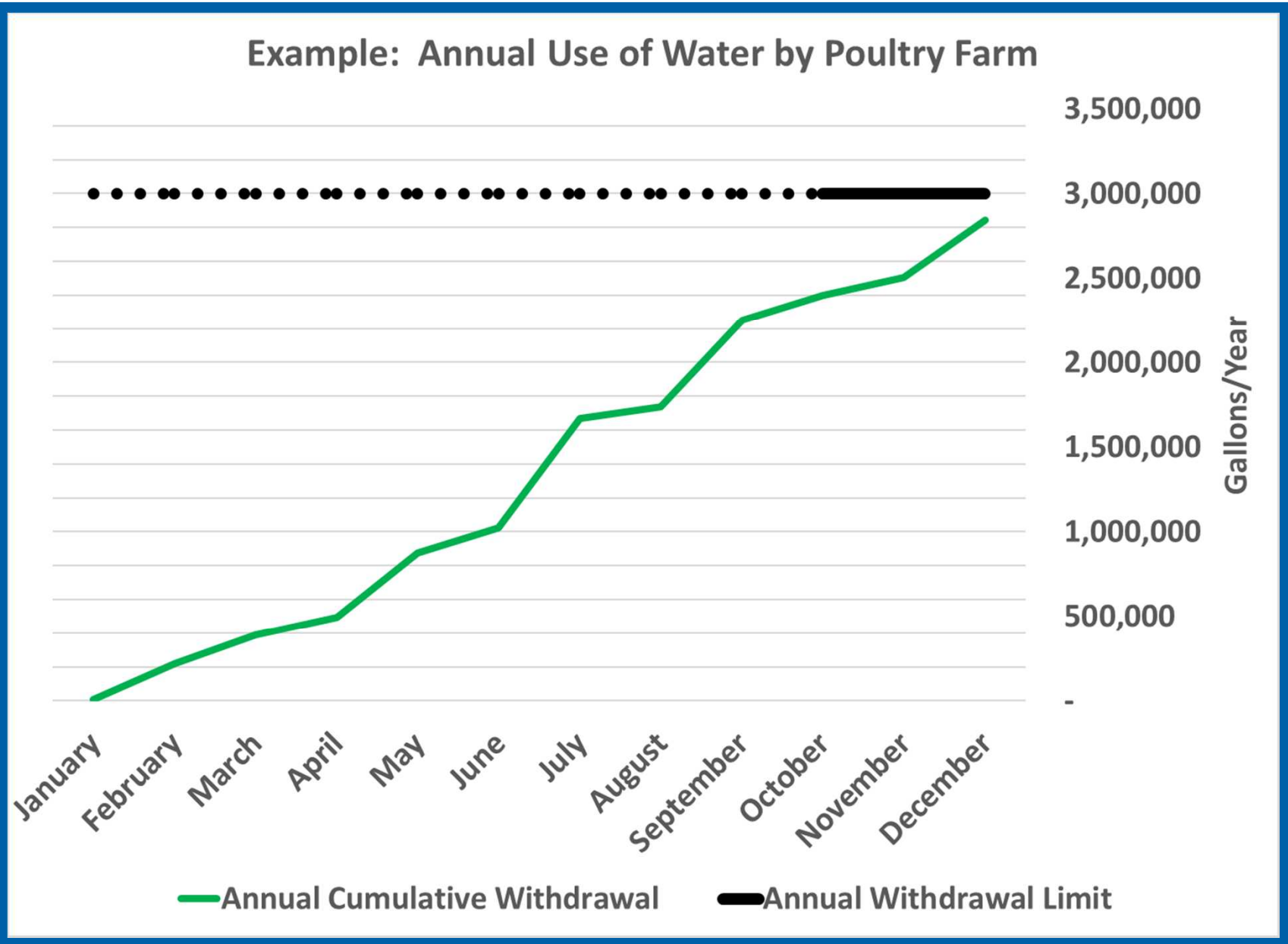
Preliminary Estimate	Final Estimate
3.1 MGD	**1.179 MGD**
-All 83 VPA facilities	-54 facilities with a CSO
-Maximum daily use every day	-Water use distribution

Demand Justification

Withdrawals fluctuate over the year:

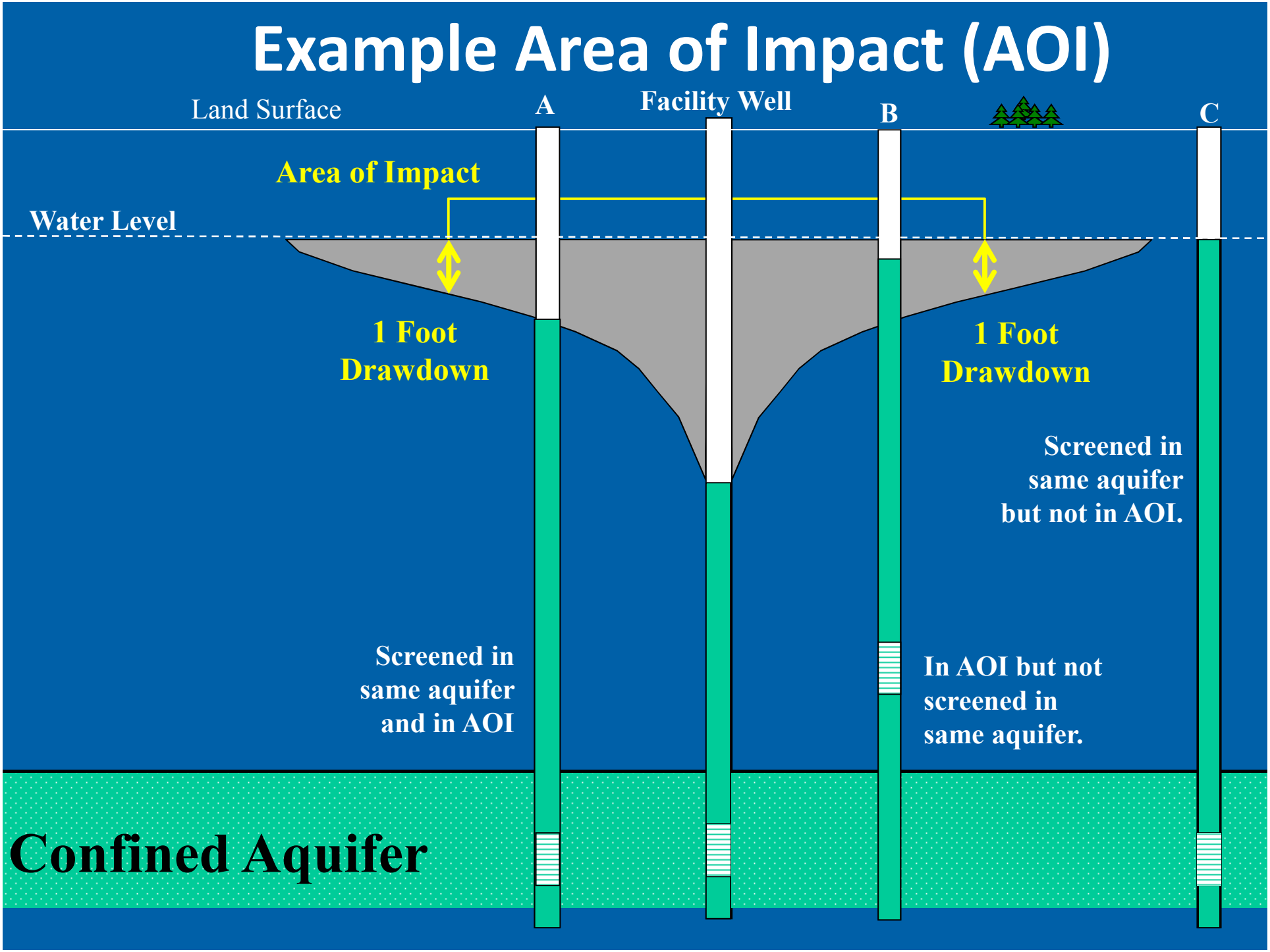
- Consumption - based on bird age; days 20-30 of each cycle
- Cooling - high use when external temperature reaches 80 degrees F
- Example farm – 645,000 total gallons in July
  – 511,000 total gallons in September
  – 330,000 total gallons in December


Example: Monthly Use of Water by Poultry Farm
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
Gallons/Month
January
February
March
April
May
June
July
August
September
October
November
December
Monthly Withdrawal
Monthly Withdrawal Limit

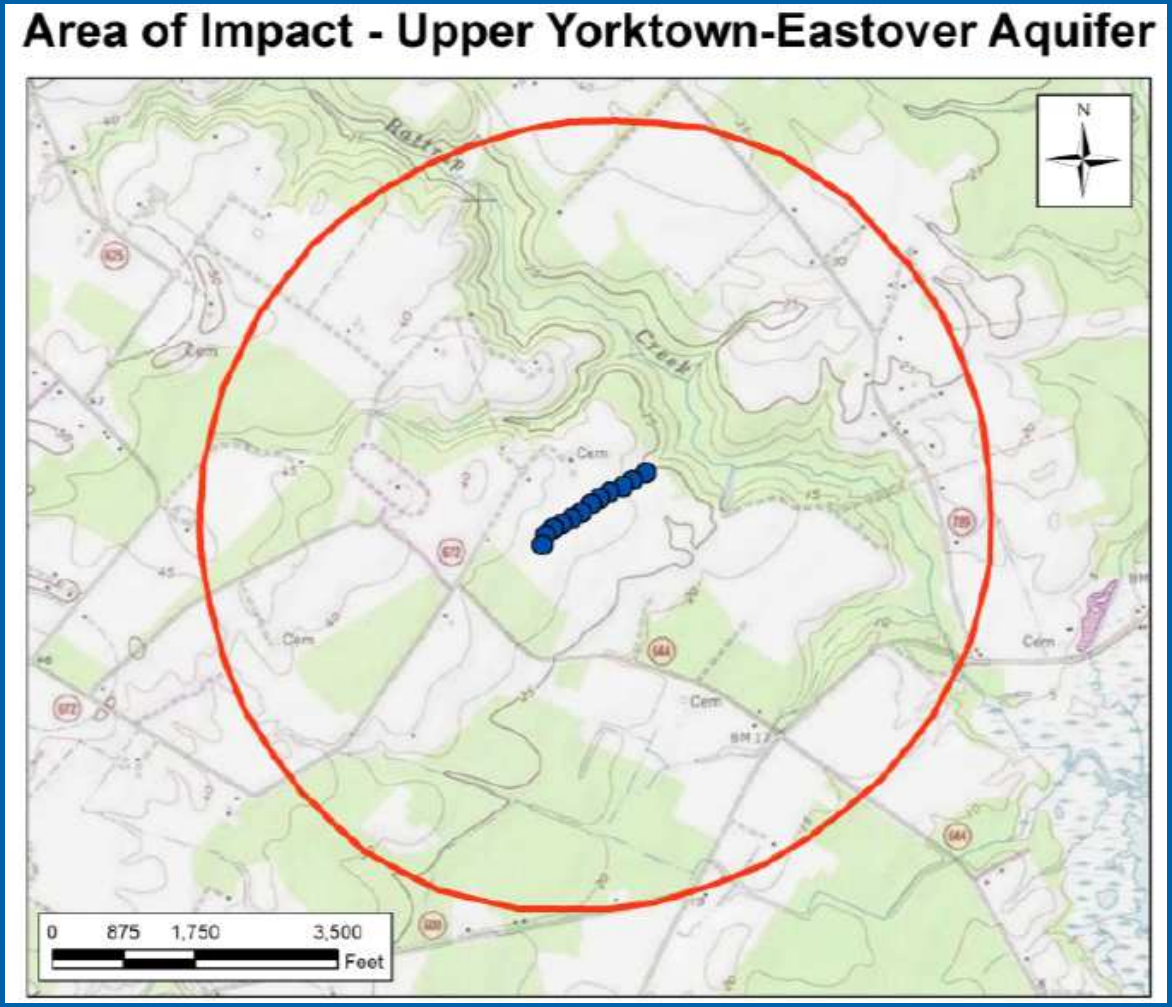

Example: Annual Use of Water by Poultry Farm
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
Gallons/Year
January
February
March
April
May
June
July
August
September
October
November
December
Annual Cumulative Withdrawal
Annual Withdrawal Limit

Technical Evaluation

- Eastern Shore Groundwater Model
  - Regional Model of Eastern Shore Aquifer System
  - Proposed withdrawals are simulated for 50 years
  - Evaluated at the end of 50 years:
    - Area of Impact
    - 80% Drawdown Criterion
    - Other impacts (salt water intrusion)

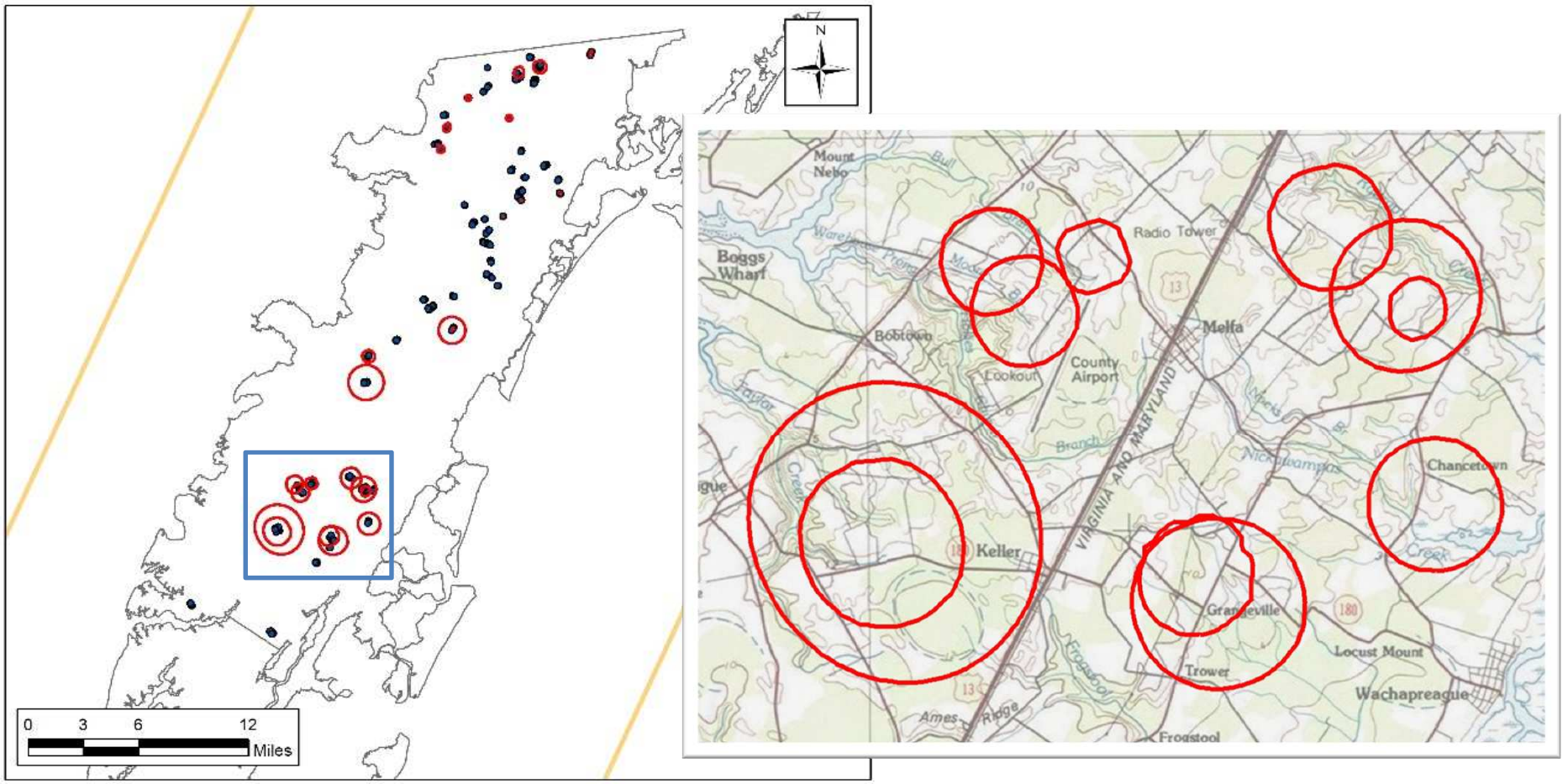

Example Area of Impact (AOI)
Land Surface
A
Facility Well
B
C
Area of Impact
Water Level
1 Foot Drawdown
1 Foot Drawdown
Screened in same aquifer but not in AOI.
Screened in same aquifer and in AOI
In AOI but not screened in same aquifer.
Confined Aquifer

Example Facility AOI



- Example: 15 million gallons a year from the Upper Yorktown-Eastover
- AOI – maximum radius of 0.7 miles from pumping wells
- Provides basis for mitigation in permit

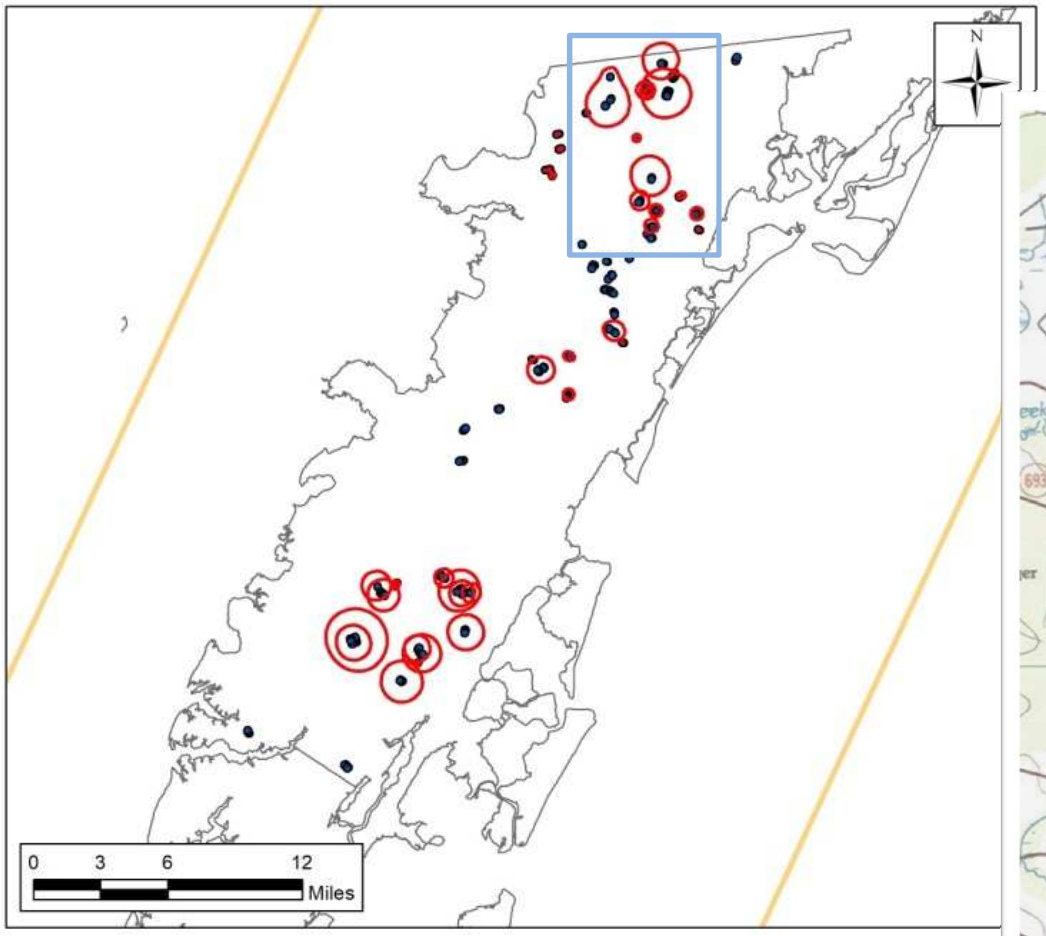
Eastern Shore Poultry
Area of Impacts - Upper Yorktown-Eastover Aquifer

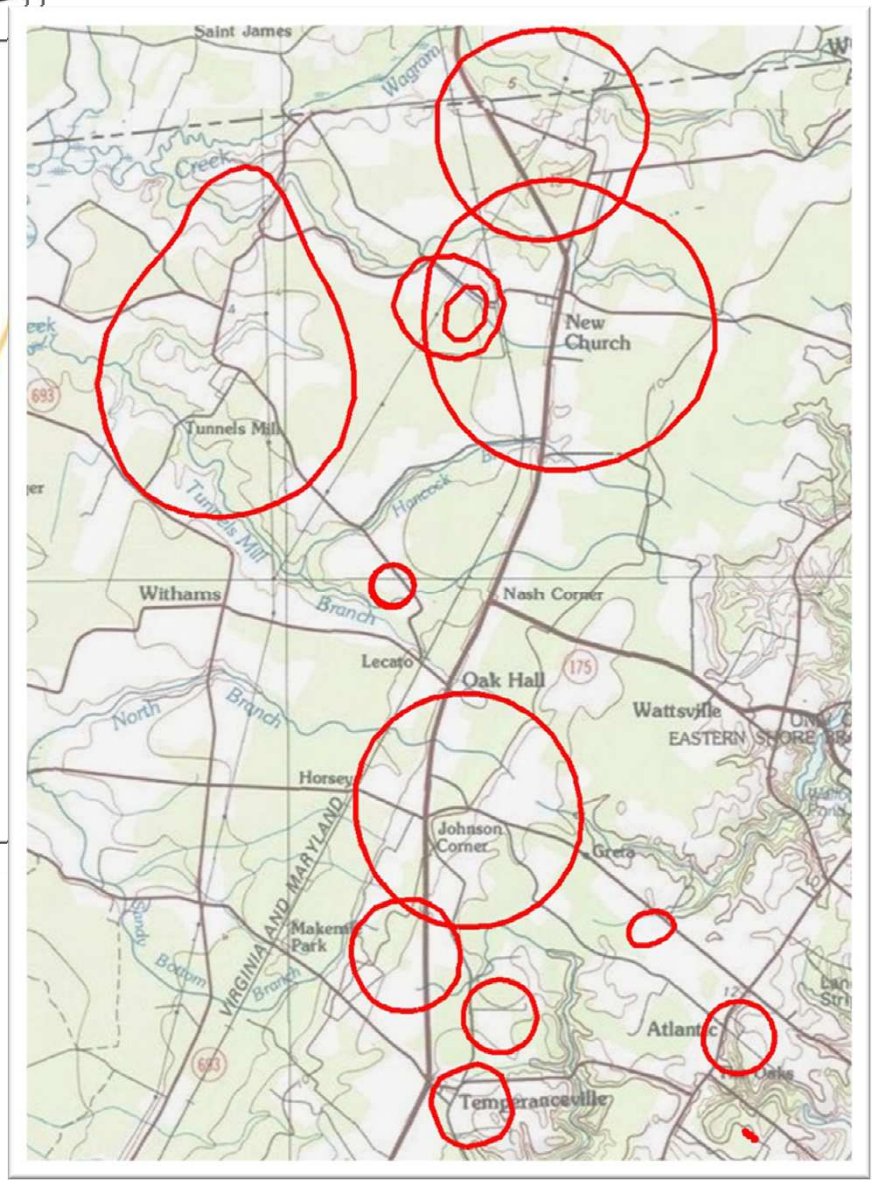


- Eastern Shore Poultry Wells
- Upper Yorktown-Eastover Area of Impacts

Simulated drawdown at or exceeding one foot in the Upper Yorktown-Eastover aquifer resulting from a individual technical evaluation simulations for 50 years from the Upper, Middle, or Lower Yorktown-Eastover aquifers using the VAHydroGW-ES.

Eastern Shore Poultry
Area of Impacts - Middle Yorktown-Eastover Aquifer

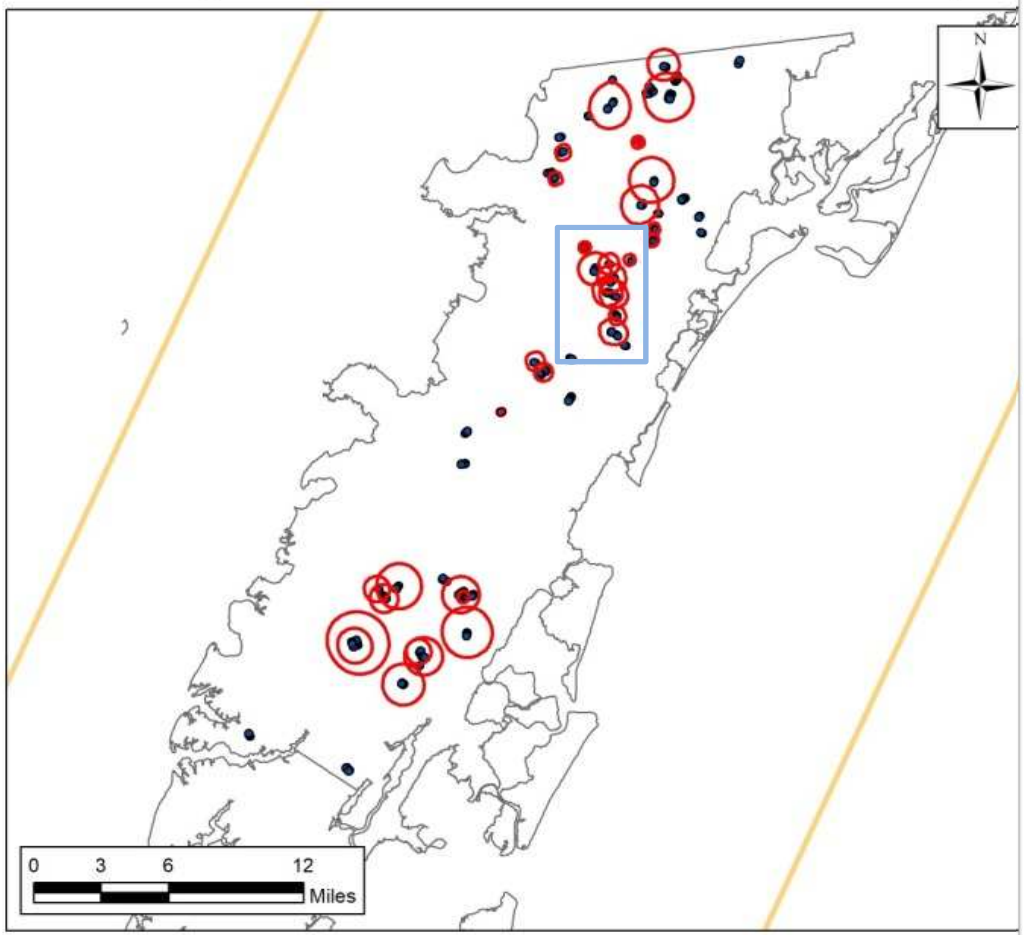


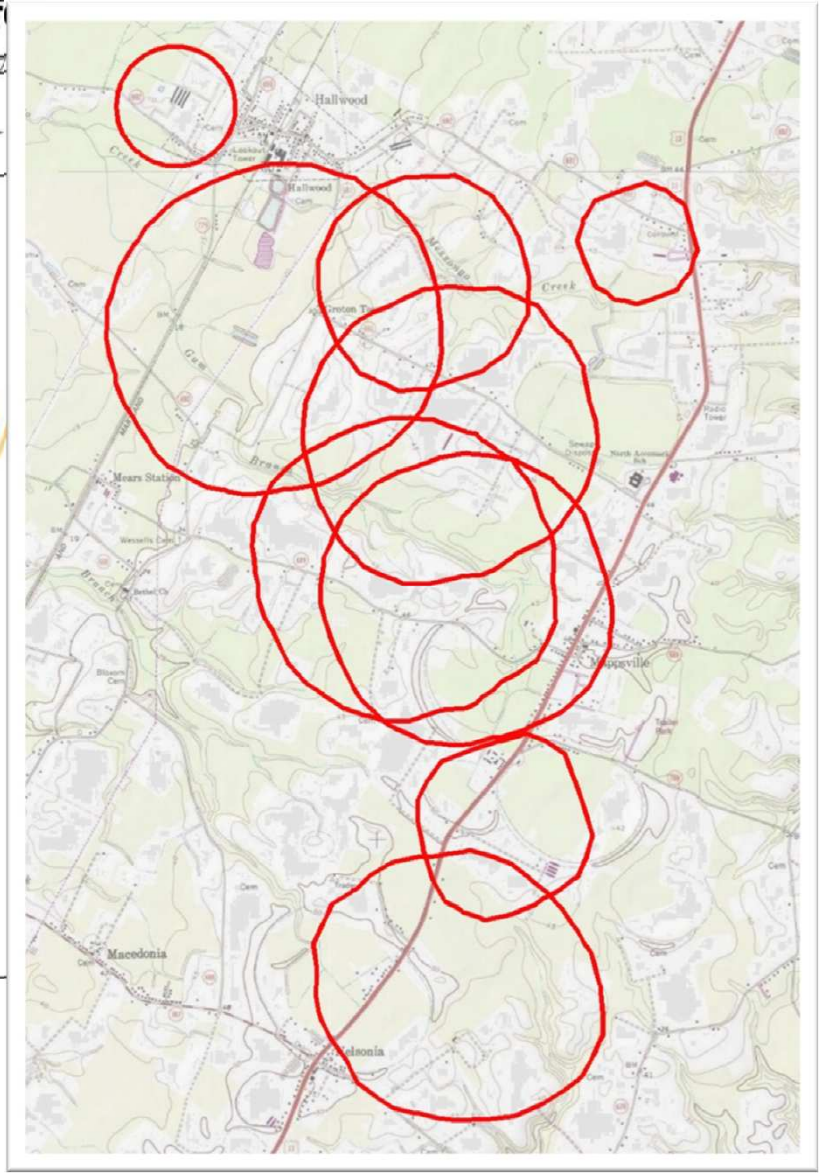


- Eastern Shore Poultry Wells
- Middle Yorktown-Eastover Area of Impacts

Simulated drawdown at or exceeding one foot in the Middle Yorktown-Eastover aquifer resulting from a individual technical evaluation simulations for 50 years from the Upper, Middle, or Lower Yorktown-Eastover aquifers using the VAHydroGW-ES.

Eastern Shore Poultry
Area of Impacts - Lower Yorktown-Eastover Aquif

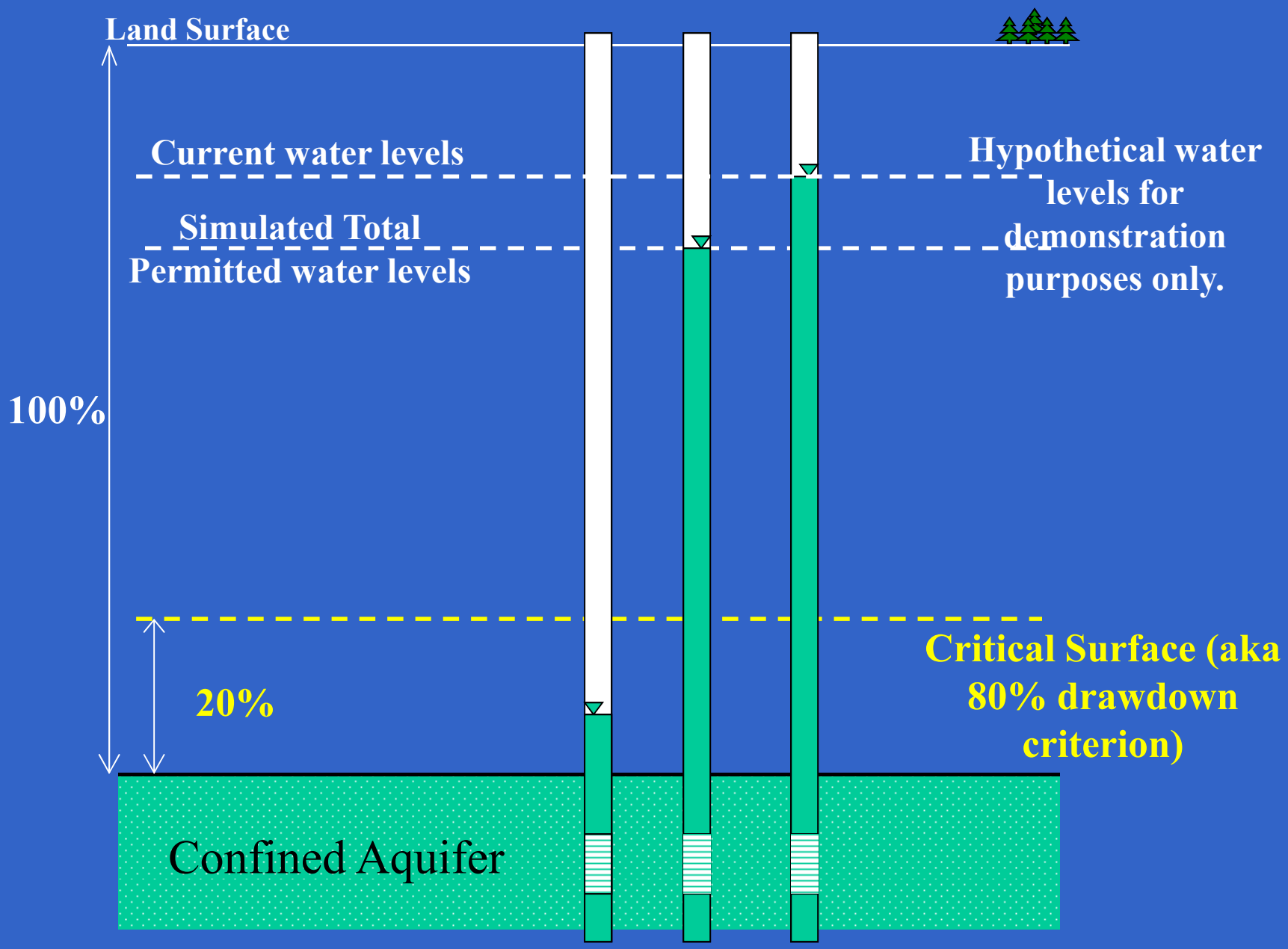




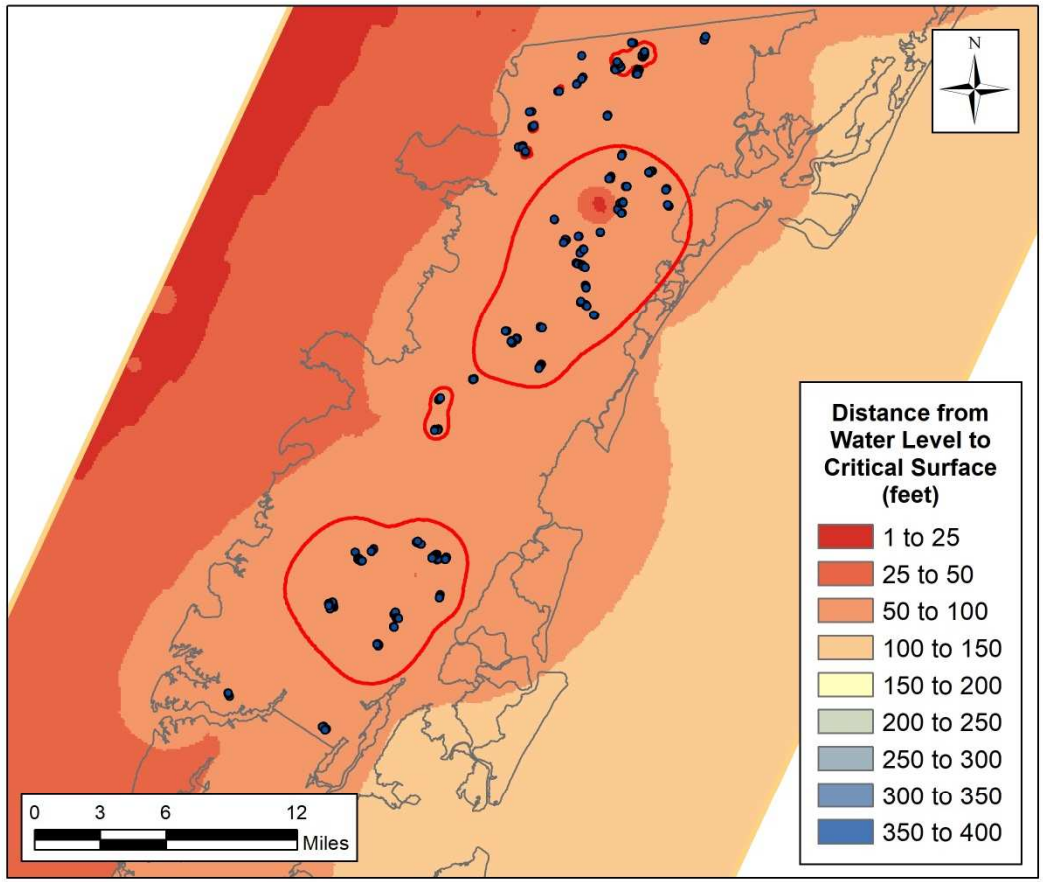
- Eastern Shore Poultry Wells
- Lower Yorktown-Eastover Area of Impacts

Simulated drawdown at or exceeding one foot in the Lower Yorktown-Eastover aquifer resulting from a individual technical evaluation simulations for 50 years from the Upper, Middle, or Lower Yorktown-Eastover aquifers using the VAHydroGW-ES.

Example 80% Drawdown Criterion



Eastern Shore Poultry Combined Simulation
Distance from Water Level to Critical Surface
Upper Yorktown-Eastover Aquifer

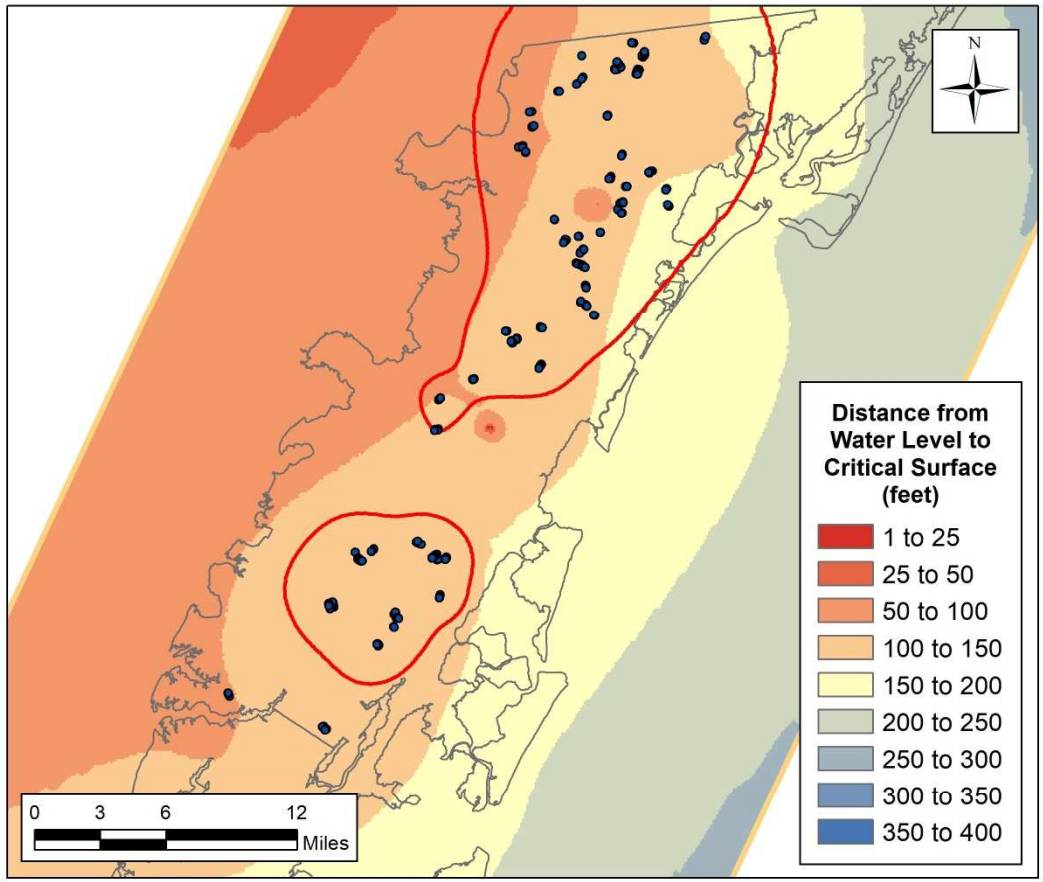


Eastern Shore Poultry Wells

Upper Yorktown-Eastover Area of Impact

Distance from simulated water levels to the critical surface for the Upper Yorktown-Eastover aquifer resulting from a 430,400,000 gallon per year (1,179,178 average gpd), 50 year withdrawal from the Surficial and Yorktown-Eastover aquifers using the VESM.

Eastern Shore Poultry Combined Simulation
Distance from Water Level to Critical Surface
Middle Yorktown-Eastover Aquifer

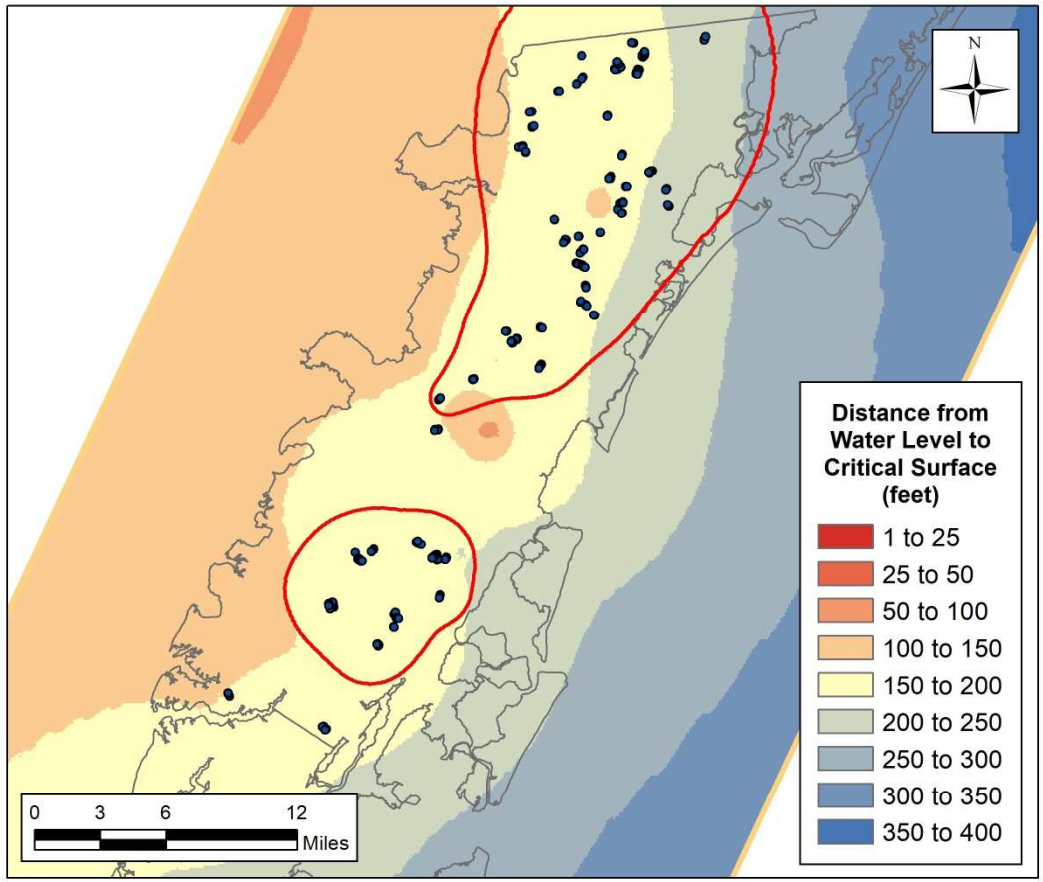


Eastern Shore Poultry Wells

Middle Yorktown-Eastover Area of Impact

Distance from simulated water levels to the critical surface for the Middle Yorktown-Eastover aquifer resulting from a 430,400,000 gallon per year (1,179,178 average gpd), 50 year withdrawal from the Surficial and Yorktown-Eastover aquifers using the VESM.

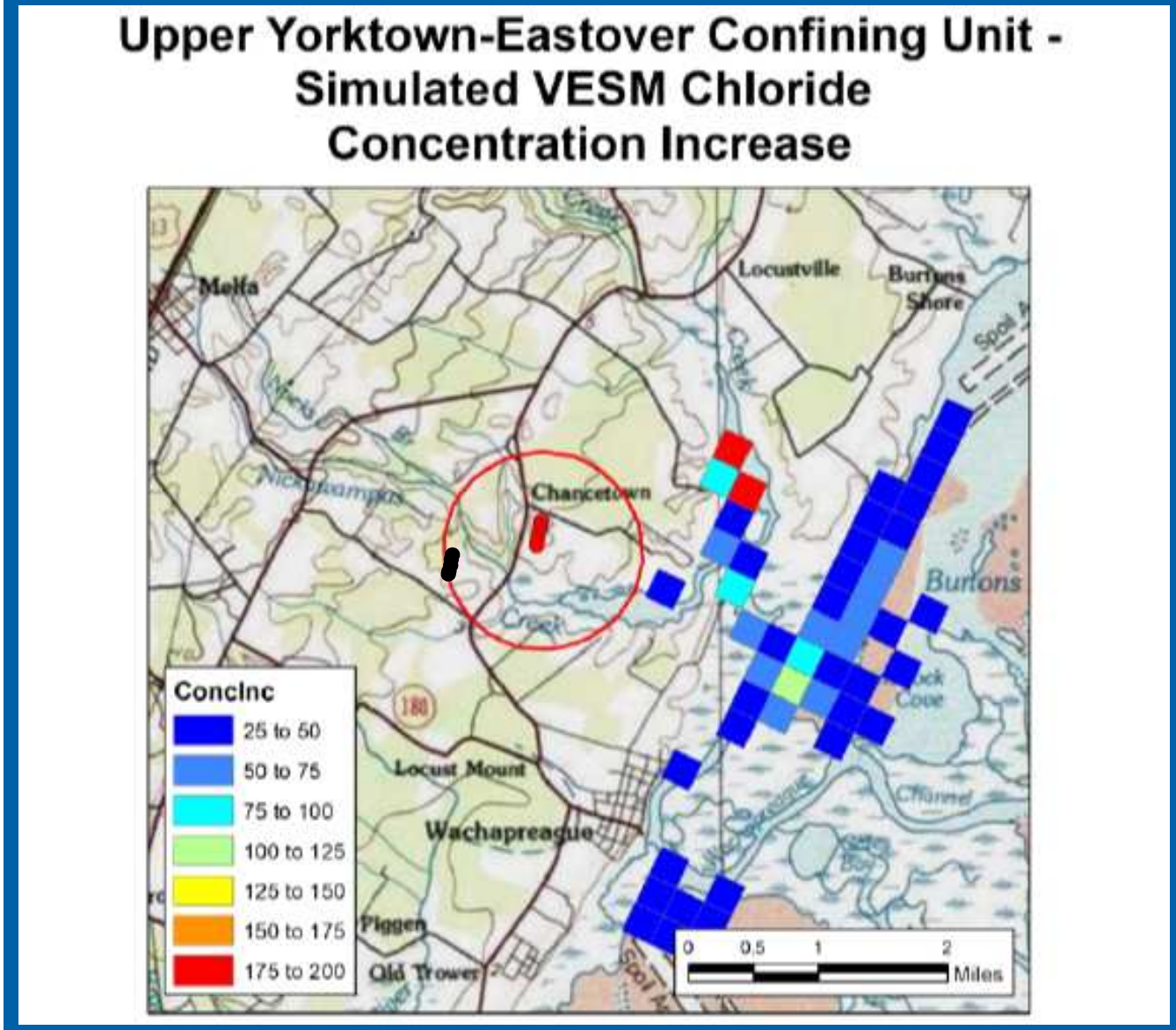
Eastern Shore Poultry Combined Simulation
Distance from Water Level to Critical Surface
Lower Yorktown-Eastover Aquifer



Eastern Shore Poultry Wells

Lower Yorktown-Eastover Area of Impact

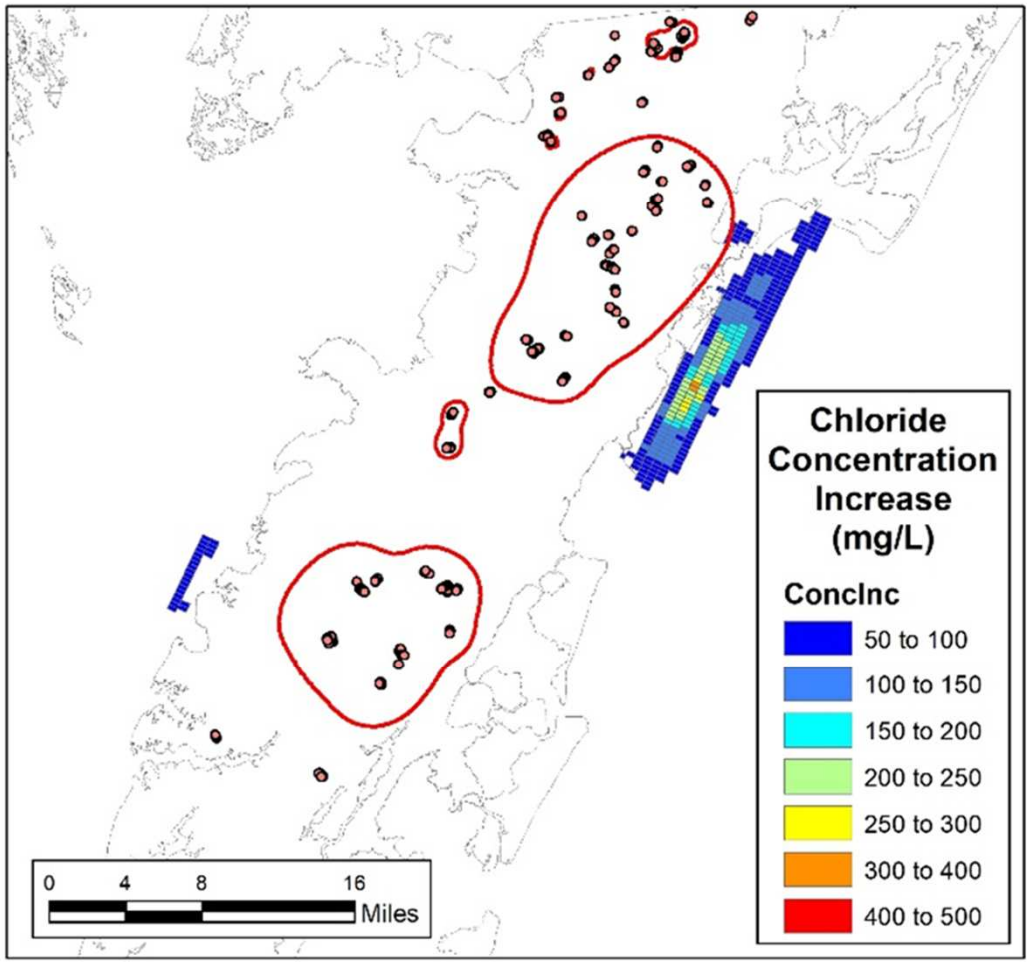
Distance from simulated water levels to the critical surface for the Lower Yorktown-Eastover aquifer resulting from a 430,400,000 gallon per year (1,179,178 average gpd), 50 year withdrawal from the Surficial and Yorktown-Eastover aquifers using the VESM.



Impacts to Water Quality

- Model also evaluates relative change in chloride
- Example: annual withdrawal of 10,000,000 gallons

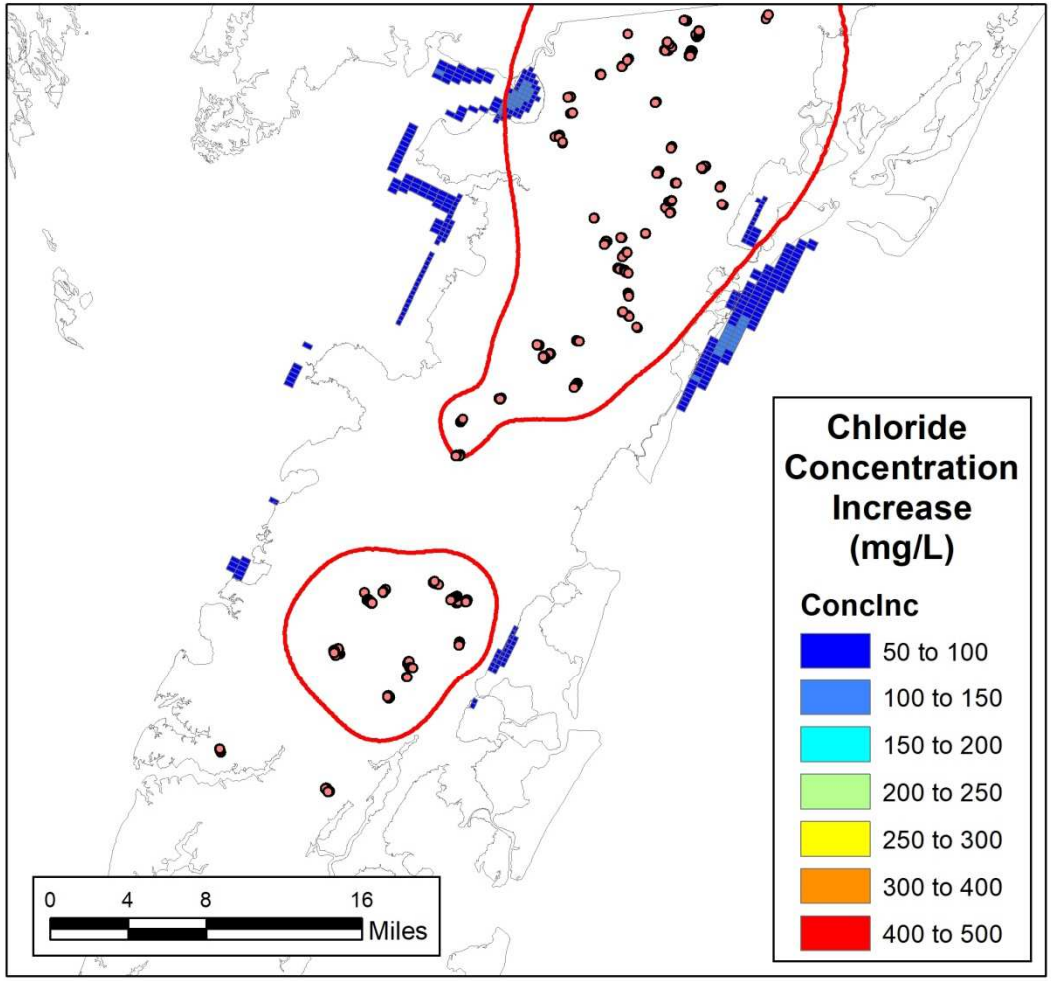
Eastern Shore Poultry Combined Simulation - Upper Yorktown-Eastover Aquifer Simulated VESM Chloride Concentration Increase



Upper Yorktown-Eastover Aquifer AOI

Eastern Shore Poultry Wells

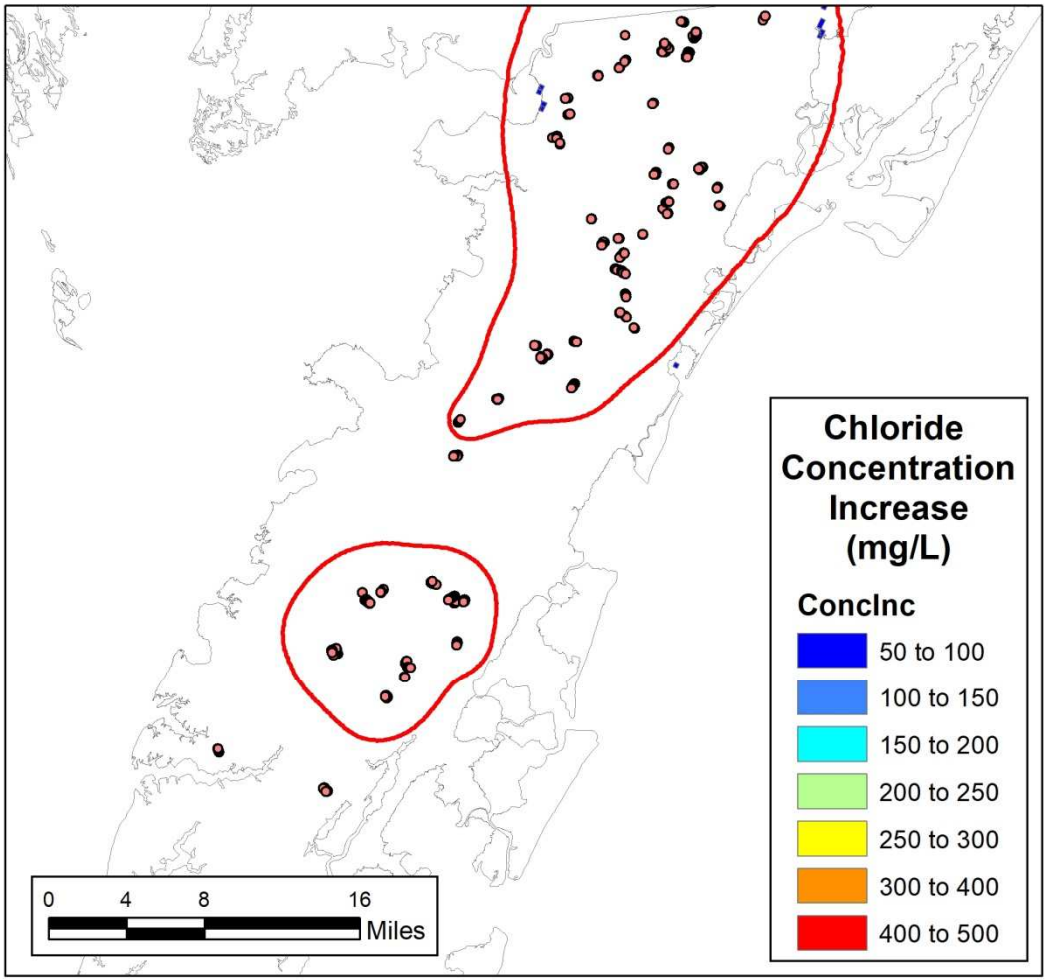
Eastern Shore Poultry Combined Simulation - Middle Yorktown-Eastover Aquifer Simulated VESM Chloride Concentration Increase



Middle Yorktown-Eastover Aquifer AOI

Eastern Shore Poultry Wells

Eastern Shore Poultry Combined Simulation - Lower Yorktown-Eastover Aquifer Simulated VESM Chloride Concentration Increase



Lower Yorktown-Eastover Aquifer AOI

Eastern Shore Poultry Wells

What does a groundwater withdrawal permit include?

- Permit limits are based on Technical Evaluation Process
- All draft permits may include:
  - Monthly and annual withdrawal limits
  - Withdrawal metering and reporting requirements
  - Mitigation Plan for adverse impacts
  - Water Conservation and Management Plan
  - General conditions
  - Special conditions

What does a groundwater withdrawal permit include?

- Special conditions may include:
  - Geophysical Logging
  - Well Abandonment
  - Camera Surveys
  - Water Quality Monitoring
  - Alternative Source Evaluation

Next Steps – Public Involvement

- Public Comment
  - Notices will be published in the *Eastern Shore Post* on May 24, 2019
  - Public Comment Period: May 24, 2019 through July 12, 2019

Next Steps – Public Involvement

- Public Hearings (all start at 6:00 pm)
  - Monday, June 24: Arcadia High School, Oak Hall
  - Tuesday June 25: Eastern Shore Community College, Melfa
  - Wednesday, June 26: Northampton High School, Eastville

Next Steps – Public Involvement

- DEQ will review all comments received through public notice and public hearings
- Draft Permits may be revised to address comments
- Summary of public comments and DEQ response to the comments will be made available once complete

Next Steps – Permit Decisions

- DEQ staff will present draft permits and public comments to the State Water Control Board for approval
- Currently scheduled for September 6th, 2019

Questions will be answered out front.